



PATENT COOPERATION TREATY

PCT

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 4007/129037	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/002668	International filing date (day/month/year) 14 March 2003 (14.03.2003)	Priority date (day/month/year) 05 April 2002 (05.04.2002)
International Patent Classification (IPC) or national classification and IPC B64D 11/06, B60N 2/48, A47C 7/38		
Applicant RECARO AIRCRAFT SEATING GMBH & CO. KG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:

- I Basis of the report
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

Date of submission of the demand 03 June 2003 (03.06.2003)	Date of completion of this report 11 June 2004 (11.06.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/002668

I. Basis of the report

1. With regard to the elements of the international application:^{*} the international application as originally filed the description:

pages _____ 4-13, as originally filed

pages _____, filed with the demand

pages _____ 1,2,2a,3, filed with the letter of 26 May 2004 (26.05.2004)

 the claims:

pages _____, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages _____ 1-11, filed with the letter of 26 May 2004 (26.05.2004)

 the drawings:

pages _____ 1/3-3/3, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

 the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

 the language of a translation furnished for the purposes of international search (under Rule 23.1(b)). the language of publication of the international application (under Rule 48.3(b)). the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

 contained in the international application in written form. filed together with the international application in computer readable form. furnished subsequently to this Authority in written form. furnished subsequently to this Authority in computer readable form. The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished. The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. The amendments have resulted in the cancellation of: the description, pages _____ the claims, Nos. _____ the drawings, sheets/fig _____5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).^{**}

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP 03/02668

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-11	YES
	Claims		NO
Inventive step (IS)	Claims	1-11	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-11	YES
	Claims		NO

2. Citations and explanations

1. Cited documents

D1: US-A-3 655 241
 D2: US-A-3 547 486
 D3: US-A-6 250 716
 D4: WO-A-95/09742

2. Claim 1

2.1 Following the wording of claim 1, document D1 discloses the following:

head restraint for a motor vehicle seat, with at least one angle adjustment mechanism (see, for example, column 2, lines 66 to 75) and a height adjustment mechanism (see, for example, column 3, line 1, "The height adjusting bars ...") for adjusting the angle and height of the head restraint relative to the seat backrest on which the head restraint can be mounted (see figure 1); wherein a pivot axis (21/4) for the various angled positions of the head restraint is mounted on a guide element (10) at the opposite end from the head restraint, the guide element being slidably

connected to a longitudinal track (12) which, together with the guide element, is also part of the height adjustment mechanism, and the longitudinal track being an integral part of the head restraint (see figure 1 and column 3, lines 1 to 7); and wherein the pivot axis of each guide element is stationary relative to the backrest (see figure 1).

- 2.2 The subject matter of claim 1 differs from this known head restraint in that:

the height adjustment mechanism is mounted between the pivot axis for the head restraint angle adjustment mechanism and the side of the head restraint that faces away from the seat occupant.

The subject matter of claim 1 is therefore novel (PCT Article 33(1) and (2)).

- 2.3 The effect of this feature is that it makes it possible to avoid a collision between the head restraint and the backrest during the height adjustment operation. The problem addressed by the present invention can therefore be seen as that of providing more adjustment options.

The claimed solution is not suggested by any of the aforementioned documents.

In document D2, as in D1, the height adjustment mechanism is built into the body of the head restraint.

The same applies to the head restraint described in document D3. Notably, the problem mentioned above does not arise in D3 because the pivot axis moves together

with the head restraint during the height adjustment operation.

The height adjustment mechanism in document D4 is located between the backrest and the pivot axis for angle adjustment, and is partially built into the backrest.

3. Dependent claims 2 to 11

- 3.1 Claims 2 to 11 are dependent on claim 1 and therefore also meet the PCT requirements in respect of novelty and inventive step.

27-05-2004

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[1]

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Headrest for a Seat

The invention relates to a headrest for a seat, preferably a passenger seat, in particular an aircraft passenger seat, having the characteristics specified in the preamble of claim 1.

A generic headrest of the state of the art has been disclosed in WO 95/09742. The headrest described in this document has a tilting and a height adjustment mechanism for adjustment of the tilt and accordingly height of the headrest relative to the backrest of a seat. The adjustment mechanisms for tilt and height are mounted on the rear side of the headrest facing away from the seat occupant and are partly integrated with the backrest of the respective seat. The longitudinal guides for the height adjustment mechanism are a component of the backrest

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[2]

and are rigidly connected to the frame structure of this backrest. The pivot shaft about which the headrest moves as its tilt is adjusted is positioned in the plane formed by the longitudinal guides and is correspondingly repositioned vertically when the height of the headrest is adjusted. The components of the tilt and height adjustment mechanism are mounted in the central area of the headrest, so that the potential tilt adjustment range, in particular, is reduced by the disclosed solution.

US-A-3 655 241 and US-A-3 547 486 disclose generic headrests for a passenger seat having at least one tilt and one height adjustment mechanism for adjustment of the tilt or the height of the headrest relative to the backrest of the seat on which the headrest may be mounted, a pivot shaft for the respective tilt adjustment of the headrest being mounted on an associated guide component facing away from the headrest, which, being mounted so as to be movable, operates in conjunction with a longitudinal guide and together with the latter constitutes a component of the height adjustment mechanism, the longitudinal guide being an integral component of the headrest and the pivot shaft of the respective guide component being mounted so as to be stationary relative to the backrest.

In the disclosed generic solutions the pivot shaft as tilt adjustment mechanism is guided along the upper side of the backrest and is mounted in a common plane with the longitudinal guide of the height adjustment mechanism. In the respective disclosed configuration the headrest may be moved back and forth relative to the backrest, and the additional option exists of pivoting the headrest forward and backward for the purpose of tilt adjustment, specifically as a result of the course of the pivot shaft diagonally and along the upper side of the backrest. The potential

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headrest adjustments of the respective configuration are accordingly restricted. The known generic solutions are also complicated in design.

On the basis of this state of the art the object of the invention is further improvement in the disclosed headrest solutions to the end that the overall design cost will be lowered and at the same time the height and tilt adjustment options will be increased.

This object is attained by means of a headrest having the features specified in patent claim 1 in its entirety. In that, as is specified in the characterizing part of claim 1, the height adjustment mechanism is mounted between the pivot shaft for tilt adjustment of the headrest and the side of the headrest facing away from the seat occupant, the backrest structure can be greatly simplified in design, since no reinforcing structures or guide rails are needed on its frame for seating a headrest, and the options for height and tilt adjustment of the headrest relative to the backrest are greatly increased. So as to be stationary relative to the backrest, the design of the backrest structure can be greatly simplified, since no reinforcing structures or guide rails are needed on the frame of this structure for the mounting of a headrest and the height and tilt adjustment options for this headrest relative to the backrest are substantially increased. Thus, the headrest with its lower side may be pulled out as far as the pivot mechanism for adjustment of tilt, with the result that no parts of the headrest may now collide with the backrest, a situation which results in corresponding restriction of options in the case of the known solutions. The solution claimed for the invention optimizes the range of adjustment of the tilt of the headrest so that the tilt may be adjusted to the extent of extreme tilt angles.

In another preferred embodiment of the headrest claimed for the invention the height adjustment mechanism has a catch positioning mechanism. In this way the headrest may be

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adjusted repeatedly and simply to specific assigned or assignable height positions. In one especially preferred embodiment the catch positioning mechanism has in the longitudinal guide a spacing component with recesses into which a prestressed catch component of the guide component may be engaged. The at least partial integration of the catch positioning mechanism with the longitudinal guide results in an especially compact and accordingly space-saving configuration of the height adjustment mechanism.

In one especially preferred embodiment of the headrest claimed for the invention the height adjustment mechanism has at least one energy accumulator component, in particular in the form of a tension spring which extends along the respective longitudinal guide and is articulated with a point of application on the guide component and with another point of application in the area of the lower side of the headrest. The energy accumulator component supports the movement of adjustment in the direction opposite the direction of gravity (upward) during height adjustment of the headrest. In one particular cost-effective embodiment the energy accumulator component is in the form of at least one tension spring. Extension along the longitudinal guide results in optimal transfer of force from the energy accumulator component to the headrest, along with avoidance of the presence of a cantilever on the guide component, which may result in jamming of the guide component in the longitudinal guide and accordingly poor controllability of the height adjustment mechanism.

In another preferred embodiment the guide component has a recess for the energy accumulator component such that the energy accumulator component is integrated with the guide component when the headrest is in the fully extended position. Optimal utilization of the adjustment path for the height adjustment is thereby ensured.

[12]

Claims

1. A headrest (1) for a seat (3), preferably a passenger seat, in particular an aircraft passenger seat, having at least one tilt (27) and one height adjustment mechanism (12) for adjustment of the tilt or the height of the headrest (1) relative to the backrest (2) of the seat (3) on which the headrest (1) may be mounted, a pivot shaft (28) for the respective tilt adjustment of the headrest (1) being mounted facing away from the headrest (1) on an associated guide component (14) which, being displaceable, operates in conjunction with a longitudinal guide and together with this component constitutes a part of the height adjustment mechanism (12), the longitudinal guide (13) being an integral component of the headrest (1) and the pivot shaft (28) of the respective guide component (14) being mounted so as to be stationary relative to the backrest (2), characterized in that the height adjustment mechanism (12) is mounted between the pivot shaft (28) for adjustment of the tilt of the headrest (1) and the side of the headrest (1) facing away from a seat occupant.
2. The headrest as claimed in claim 1 or 2, wherein the height adjustment mechanism (12) has a catch positioning mechanism (15).
3. The headrest as claimed in claim 3, wherein the catch positioning mechanism (15) has in the longitudinal guide (13) a spacing component (16) having recesses (17) in which a prestressed catch component (18) of the guide component (14) may be engaged.

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4. The headrest as claimed in one of claims 1 to 3, wherein the height adjustment mechanism (12) has at least one energy accumulator component (19), especially in the form of a tension spring, which extends along the respective longitudinal guide (13) and is coupled with a point of application (20) on the guide component (14) and with another point of application (21) in the area of the lower side of the headrest (1).
5. The headrest as claimed in claim 4, wherein a seating component (23) which is detachably connected to the headrest (1) serves as the other point of application (21) in the area of the lower side of the headrest (1).
6. The headrest as claimed in claim 4 or 5, wherein the guide component (14) has a recess for the energy accumulator component (19) such that, when the headrest (1) is in the fully extended position, the energy accumulator component (19) is integrated with the guide component (14).
7. The headrest as claimed in one of claims 1 to 6, wherein such headrest is provided with two side components (7) which may be mounted relative to a base component (6) in assignable angular positions relative to the base component (6) and by way of a locking mechanism (8), a catch mechanism in particular.
8. The headrest as claimed in one of claims 1 to 7, wherein the pivot shaft (28) is in the form of a friction coupling (29) on the guide component (14) and wherein a fastening point (30) for the headrest (1) is connected to the guide component (14) on a backrest (2) by way of the friction coupling (29).

[14]

9. The headrest as claimed in claim 7 or 8, wherein the base component (6) and the two side components (7) are configured as laminar molded components.
10. The headrest as claimed in claim 9, wherein the base component (6) has a central recess (10) and wherein the height and tilt adjustment mechanisms (11) extend on both sides beside the central recess (10) along the base component (6) facing the two side components (7).
11. The headrest as claimed in one of claims 7 to 10, wherein a lighting fixture is seated in the padding of at least one of the two side components (7).